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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,988	12/13/2001	James M. Florence	SLA0354	7651

7590 08/26/2004  
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EXAMINER
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LAVARIAS, ARNEL C

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/021,988

Applicant(s)

FLORENCE, JAMES M.

Examiner

Arnel C. Lavarias

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION*****Response to Amendment***

1. The amendments to Claims 10, 13, and 21 in the submission dated 6/18/04 are acknowledged and accepted.

***Response to Arguments***

2. The Applicant's arguments filed 6/18/04 have been fully considered but they are not persuasive. In response to Applicant's arguments (See in particular Pages 8-9 of Applicant's remarks submitted 6/18/04), the Examiner notes that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the instant case, Ito et al. already discloses the recited polarized light beam splitter assembly including an embedded wire grid polarizer (See Figure 16 of Ito et al.). It was further noted that Ito et al. does not specifically disclose how the second surface of the wire grid polarizer is secured to the second internal exposed surface of the prism in the perimeter region. However, Matsuda teaches one particular method (See Figure 8) for securing the second surface of the wire grid polarizer (i.e. the lower surface of transparent heat sink 32 on which wire grids 34A and 34B are attached) to an internal exposed surface of a substrate (See upper surface of optical coupling device 31 on which PD1, PD2, PD5, PD8 are located). It is additionally noted that transparent heat

sink 31 is preferably made of sapphire, or of any other transparent material that additionally has the function to quickly conduct heat, and that the incident light from the laser diode (See 39 in Figure 6) must traverse through the transparent heat sink and is split based on polarization at the wire grid polarizers 34A and 34B. Light polarized in one direction is transmitted through the wire grid polarizers and is detected by detectors PD2 and PD5, while light polarized in the orthogonal direction is reflected by the wire grid polarizers and is detected by detectors PD1 and PD8.

3. Additionally, with regard to Applicant's remarks that Yamada et al. does not address beam splitter prisms, the Examiner notes that Matsuda discloses the use of solder layers to provide the spacing between the wire grids/transparent heat sink and the substrate. However, Yamada was cited to evidence an alternative solution to providing such spacings by utilizing glass beads, as is well known in the art, for providing accurate, precise and uniform spacings between the elements.
4. Finally, it is noted that Perkins et al. is being relied upon for the teaching of positioning the first and second internal exposed surfaces at an angle in a range of 40-50 degrees. The teachings suggesting a gap between a surface of the polarizer and a beam splitter prism section is already provided by the Ito et al. and Matsuda.
5. Claims 1-21 are rejected as follows.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 10-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 10, as amended, recites a polarized light beam splitter assembly, including an embedded wire grid polarizer including an uppermost raised surface, wherein a perimeter region of the uppermost raised surface is secured to an internal surface of the beam splitter. It is clear from Figure 3 of the Applicant's disclosure that, if 28 is the wire grid of the wire grid polarizer 24, then the uppermost raised surface of the wire grid would be that surface of the wire grid 28 closest to surface 20 of prism 16. Thus, the perimeter region of this uppermost raised surface would correspond to the edges of the wire grid 28. However, neither the figures nor the written description of the disclosure discloses that the perimeter region of the uppermost raised surface is secured to an internal surface of the beam splitter. Claims 11-16 are dependent on Claim 10, and hence inherit the deficiencies of Claim 10.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-2, 4, 6-7, 9-11, 14, 17-18, 20-21, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (U.S. Patent Application Publication US2003/0179345 A1), of record, in view of Matsuda (U.S. Patent No. 5703861), of record.

Ito et al. discloses a polarized light beam splitter assembly (See for example Figure 16) comprising a polarized light beam splitter prism (See 10, 40 in Figure 16) in the form of a glass cube and including a first internal exposed surface (See surface on 40 attached to 210 in Figure 16) and a second internal exposed surface (See S10 in Figure 16); and a wire grid polarizer (See 211 in Figure 16) including a first surface (See surface of 210 attached to 40 in Figure 16) and a second surface (See surface on 210 attached to polarizer grid 211 in Figure 16) raised from and parallel to the first surface and including a perimeter region and a central region, the first surface of the wire grid polarizer secured to the first internal exposed surface of the prism (See 40, 210 in Figure 16), and the second surface of the wire grid polarizer positioned next to the second internal exposed surface of the prism in the perimeter region (See 210, 10 in Figure 16) so as to define an air gap (See 212 in Figure 16) of uniform width between the second surface of the wire grid polarizer and the second internal exposed surface of the

prism in the central region such that the wire grid polarizer does not contact the second internal exposed surface of the prism in the central region. Ito et al. additionally discloses the prism defining an elongate axis and wherein the first and second internal exposed surfaces are positioned at an angle in a range of one to eighty nine degrees with respect to the elongate axis (See for example line marked 'L' in Figure 16 and direction of first and second internal exposed surfaces with respect to axis 'L' in Figure 16); the second surface of the wire grid polarizer includes a wire grid thereon (See 211 on 210 in Figure 16) such that the wire grid is in communication with the air gap and such that the wire grid does not contact the second internal exposed surface of the prism in the central region; a light source positioned to emit light having a predetermined orientation (See for example 160, 170 in Figures 7, 18) to the polarized light beam splitter (See for example 110 in Figures 1, 7-8, 10, 18); and a reflection device, such as an LCD, positioned to received light redirected by the polarized light beam splitter (See for example 300 in Figures 1, 8, 10). Ito et al. lacks the second surface of the wire grid polarizer being secured to the second internal exposed surface of the prism in the perimeter region. However, Matsuda teaches an apparatus utilizing an embedded wire grid polarizer (See for example Figure 8), wherein the wire grid polarizer (See 34A, 34B in Figure 8) is secured to an exposed internal surface of a substrate (See 31 in Figure 8) via a spacer or raised projection of solder adhesive (See rectangular spacers connecting 31 and 32 in Figure 8) so as to define a gap between a surface of the wire grid polarizer and the exposed internal surface of the beam splitter prism. Therefore, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to have the second surface of the wire grid polarizer of the polarized light beam splitter assembly of Ito et al. be secured to the second internal exposed surface of the prism in the perimeter region, as taught by Matsuda, for the purpose of providing a fixed alignment of the prism blocks and wire grid polarizer, thus reducing alignment and light scattering losses in the polarized light beam splitter assembly.

10. Claims 3, 5, 13, 19, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda as applied to Claims 1-2, 10, 17 above, and further in view of Yamada et al. (U.S. Patent No. 6013339), of record.

Ito et al. in view of Matsuda discloses the invention as set forth above in Claims 1-2, 10, 17, except for the spacers being distributed with an adhesive that secures the second surface of the wire grid polarizer to the second internal exposed surface of the prism, wherein the spacers define a rigid sphere, and wherein the height of the spacers is equal to the diameter of the rigid spheres.

However, Yamada et al. teaches that spacers may be used in the periphery of the device to attach the substrates together and to form the internal gap, and that the spacers may be in the form of rigid glass beads, all of uniform diameters to provide a gap of uniform thickness (See 2 in Figure 5; col. 10, lines 54-64).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the spacers be distributed with an adhesive that secures the second surface of the wire grid polarizer to the second internal exposed surface of the prism, wherein the spacers define a rigid sphere, and



wherein the height of the spacers is equal to the diameter of the rigid spheres, as taught by Yamada et al., in the polarized light beam splitter assembly of Ito et al. in view of Matsuda, for the purpose of sealing and protecting the wire grid polarizer, as well as provide a uniform thickness spacing between the wire grid polarizer and the exposed internal surface of the beam splitter prism.

11. Claim 8, 12, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda as applied to Claims 1, 7, and 10 above, and further in view of Perkins et al. (U.S. Patent No. 6288840), of record.

Ito et al. in view of Matsuda discloses the invention as set forth above in Claims 1, 7, and 10, except for the first and second internal exposed surfaces being positioned at an angle in a range of forty to fifty degrees with respect to the elongate axis. However, it is well known in the art to dispose wire grid polarizer elements along the diagonal of a cube prism, the diagonal of the cube prism forming approximately a forty five degree angle with an axis of propagation normal to a face of the cube prism. For example, Perkins et al. teaches a polarized light beam splitter defining an elongate axis (See axis defined either by 63 or 65 in Figure 10) and the embedded wire grid polarizer being positioned at an angle of approximately 45 degrees with respect to the elongate axis (Note that with respect to either elongate axis as defined, 61 lies on the long diagonal of the cube, and is thus at an angle of approximately 45 degrees from either elongate axis). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first and second internal exposed surfaces be positioned at an angle in a range of forty to fifty degrees with

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respect to the elongate axis, as taught by Perkins et al., in the polarized light beam splitter assembly of Ito et al. in view of Matsuda, for the purpose of simplifying the alignment of the input and output light beams.

12. Claims 15-16, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda.

Ito et al. in view of Matsuda discloses the invention as set forth above in Claims 1 and 10, except for the air gap having a width in the range of one to thirty  $\mu\text{m}$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the width of the air gap to be in the range of one to thirty  $\mu\text{m}$ , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to have the air gap have a width in the range of one to thirty  $\mu\text{m}$  for the purpose of reducing fabrication costs (since larger air gap widths require a spacer with an appropriately larger thickness or diameter) while providing a controlled air gap spacing. *In re Aller*, 220 F.2d 618, 195 USPQ 6 (CCPA 1977). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Conclusion***

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 8:30 AM - 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arnel C. Lavarias  
8/24/04



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